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EXAMINER

COLEMAN, WILLIAM D

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PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YIU MING CHEUNG, CHI MING CHONG, TAT WING LEE,
and KA LOK LEUNG

Appeal 2009-008340
Application 10/628,503
Technology Center 2800

Before JOSEPH F. RUGGIERO, ALLEN R. MACDONALD, and ROBERT
E. NAPPI, *Administrative Patent Judges*.

RUGGIERO, *Administrative Patent Judge*.

DECISION ON APPEAL¹

STATEMENT OF THE CASE

¹ The two month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304 or for filing a request for rehearing as recited in 37 C.F.R. § 41.52, begins to run from the “MAIL DATE” (paper delivery mode) or the “NOTIFICATION DATE” (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

Appellants appeal under 35 U.S.C. § 134(a) from the Final Rejection of claims 2-10 and 21. Claims 1 has been canceled, and claims 11-20 are withdrawn from consideration as being directed to a non-elected invention. Claim 22 has been indicated by the Examiner as containing allowable subject matter but is objected to as being dependent on a rejected claim. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

Rather than reiterate the arguments of Appellants and the Examiner, reference is made to the Appeal Brief (filed July 30, 2007), the Answer (mailed July 29, 2008), and the Reply Brief (filed September 24, 2008) for the respective details.

Appellants' Invention

Appellants' invention relates to thin die detachment including the use of a collet for holding and detaching a die mounted on an adhesive surface of an adhesive film. Multiple ejector pins located at specific locations with respect to the die are used to partially delaminate the die from the adhesive surface for detachment by the collet. More particularly, each ejector pin functions to contact and raise the adhesive film at a position substantially at the corners of the die. (*See generally* Spec. 3:6-19).

Claim 21 is illustrative of the invention and reads as follows:

21. An apparatus for detachment of a thin die from a film, the film having a adhesive surface on which a plurality of dice are mounted, the apparatus comprising:

an ejector device comprising a plurality of ejector pins,
the ejector pins being operative to initiate detachment of a die from the film by contacting the film under the die on a second surface of the film

opposite the adhesive surface substantially at the corners of the die within a predetermined distance from the edges of said die and by raising the film under the corners of the die; and

a collet operative to detach the die from the film after detachment has been initiated by the ejector device, and to hold the die after detachment from the film.

The Examiner's Rejections

The Examiner relies on the following prior art references to show unpatentability:

Kurosawa	US 6,201,306 B1	Mar. 13, 2001
Nishiguchi	EP 0 431 637 A1	Jun. 12, 1991

Claims 2, 6-9, and 21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Nishiguchi.

Claims 3-5 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nishiguchi.

Claims 2, 6-9, and 21 stand further rejected under 35 U.S.C. § 102(e) as being anticipated by Kurosawa.

Claims 3-5 and 10 stand further rejected under 35 U.S.C. § 103(a) as being unpatentable over Kurosawa.

ANALYSIS

35 U.S.C. § 102 REJECTIONS

Nishiguchi

Claim 21

Appellants' arguments initially focus on the contention that, in contrast to the invention set forth in independent claim 21, the ejector pins 6a-6d of Nishiguchi do not initiate the detachment of the die from the

adhesive film as claimed. According to Appellants (App. Br. 7-8; Reply Br. 1), the initiation of the die detachment in Nishiguchi is not performed by the ejector pins but, rather, by a photochemical process which weakens the adhesive bond between the die and the adhesive film by irradiation.

We do not agree with Appellants. Initially, we note that, although we consider the language “to initiate detachment . . .” in independent apparatus claim 21 to be purely functional language which does not add any structural requirements to the claim, we find no error in the Examiner’s determination (Ans. 5) that the ejector pins 6a-6d of Nishiguchi are structural elements which operate to initiate detachment of the die 5 from the adhesive film 4.

While we agree with Appellants that Nishiguchi uses an irradiation process to weaken the adhesive bond between the die 5 and the film 4, the die is nonetheless still attached to the film when the ejector pins 6a-6d make initial contact with the film. It is apparent, therefore, Appellants’ argument to the contrary notwithstanding, that it is the raising up of the film by the action of the ejector pins in Nishiguchi that is initiating the detachment of the die from the film.

We further find unpersuasive Appellants’ argument (App. Br. 7-8; Reply Br. 1-2) that Nishiguchi does not disclose the contacting of the adhesive film by the ejector pins “substantially at the corners of the die . . .” as claimed. We agree with the Examiner (Ans. 10-11) that Appellants’ broadly stated claim language leaves open the alternative broad interpretations set forth by the Examiner, both of which we find reasonable.

Initially, we agree with the Examiner (Ans. 10) that “substantially at the corners . . .” could be reasonably interpreted as contact between the ejector pins and the adhesive film at more than two of the corners of the die

but less than all of the die corners. Accordingly, even assuming *arguendo* that Appellants are correct (App. Br. 7) that Nishiguchi's Figure 6 embodiment shows ejector pin contact at only three corners of the die, there is no claim language that explicitly requires contact at *all* of the corners of the die.

Similarly, we agree with the Examiner that the claim language "substantially at the corners . . ." can be alternatively interpreted as requiring only ejector pin contact at locations which are near or approximate the exact corners of the die at a junction between two sides. As explained by the Examiner (Ans. 10-11), in Appellants' disclosed invention, the ejector pins do not contact the die at exactly the corners of the die but, rather, at a predetermined distance from the edges of the die (Spec. 6:11-7:19; Figs. 4a-4c). We find that such an arrangement is remarkably similar to what is disclosed by Nishiguchi at page 4, line 53 through page 5, line 32 and illustrated in Nishiguchi's Figure 6.

While Appellants argue (App. Br. 7) that Nishiguchi's Figure 6 embodiment discloses contact at only three corners of the die since the ejector pin 6d is displaced from the corner of the die, we do not find such argument to be persuasive. The ejector pin 6d in Nishiguchi's Figure 6 embodiment indeed makes contact with the film 4 at a larger separated distance from the die corner than the other ejector pins 6a-6c. The ejector pin 6d, however, is disclosed by Nishiguchi as being separated from the exact corner of the die only by a distance factor of 5%, which, in our view, would be reasonably recognized by an ordinarily skilled artisan as being "substantially at the corner . . ." of the die as claimed (page 5, ll. 17-32).

In view of the above discussion, we sustain the Examiner's 35 U.S.C. § 102(b) rejection of independent claim 21.

Claim 2

We also sustain the Examiner's anticipation rejection of dependent claim 2. We find no error in the Examiner's determination (Ans. 4) that, since die size varies, the size of the die as claimed is one of the factors taken into consideration in determining ejector pin spacing in Nishiguchi. Appellants' arguments (App. Br. 10) to the contrary notwithstanding, Nishiguchi explicitly discloses that a die size factor, i.e., chip surface area, is taken into consideration when determining the spacing of pin 6d from the chip corner. As disclosed by Nishiguchi, in determining pin spacing, the surface area of the chip is taken into consideration by measuring the length of a diagonal line of the lower surface of the chip (page 5, ll. 18-23).

Claims 6 and 7

The Examiner's anticipation rejection of dependent claims 6, as well as claim 7 dependent thereon, is not sustained as the Examiner has not indicated where in Nishiguchi is found a disclosure of a vacuum ejector platform as claimed. We agree with Appellants (App. Br. 10) that the only reference to a "vacuum" in Nishiguchi is with respect to collet 7 which receives the chips 5 after they are ejected from the adhesive 4 by the pins 6a-6d (page 3, ll. 33-45). We find no disclosure in Nishiguchi of any vacuum device associated with the push-up stage platform 12 that supports a portion of the film 4 on which the chips are mounted as claimed.

Claim 8

We sustain the Examiner's anticipation rejection of dependent claim 8 which includes limitations that the ejector device includes "at least four ejector pins" and that each ejector pin corresponds to a position "substantially at a corner of the die." We refer to our earlier discussion of the Examiner's alternative interpretation of "substantially at a corner . . ." as requiring only ejector pin contact at locations which are near or approximate the exact corners of the die at a junction between two sides. Under this interpretation, even though the ejector pin in Nishiguchi's Figure 6 embodiment contacts film 4 at a larger separated distance from the die corner than pins 6a-6c, this separation is only by a distance factor which, in our view, would be reasonably considered to be "substantially at the corners" of the die. Accordingly, Nishiguchi's Figure 6 embodiment can be reasonably interpreted as including four ejector pins 6a-6d with each pin being "substantially at a corner of the die" as claimed.

Claim 9

We do not sustain the Examiner's anticipation rejection of dependent claim 9, which is dependent on claim 8, and includes the limitation that one more ejector pins is at a position "substantially at a center portion" of the die. We agree with Appellants (App. Br. 10-11) that the Examiner has not indicated where this feature is found in the Nishiguchi reference. While our previous discussion found that the Examiner did not err in determining that the pins 6a-6d in Nishiguchi's Figure 6 embodiment could reasonably be interpreted as being located at "substantially at the corners" of the die, the

Examiner has never explained how such pins could also be considered to be “substantially at a center portion” of the die as set forth in claim 9.

Kurosawa

Claims 21 and 6-8

We sustain the Examiner’s anticipation rejection of independent claim 21, as well as dependent claims not 6-8 separately argued by Appellants. Appellants’ arguments (App. Br. 11; Reply Br. 1-2) direct attention to the illustrations in Figures 3A-3C, 6, and 7A-7D of Kurosawa in support of their contention that the illustrated ejector pins 17 and 27 are not “substantially at the corners of the die” as claimed.

Given the Examiner’s reasonable broad interpretation of the claimed “substantially at the corners” as previously discussed, however, our review of the cited Kurosawa’s drawing figures leads us to the opposite conclusion as we fail to see how the illustrated ejector pins 17 and 27 could be considered to be anywhere except substantially at the die corners. Appellants’ argument (App. Br. 8) that Kurosawa’s disclosure never mentions the word “corner,” or any synonymous term, is unpersuasive since a claimed invention may be anticipated by a drawing in a reference whether the drawing disclosure is intentional, or accidental and unexplained. *See In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979).

Claim 2

The anticipation rejection is not sustained as the Examiner has not pointed to any disclosure in Kurosawa that would support the stated position. Unlike the previously discussed Nishiguchi reference, which

discloses that a die size factor such as the surface area of the chip is taken into consideration when determining pin spacing by measuring the length of a diagonal line of the lower surface of the chip, Kurosawa has no teaching or suggestion that any of the claimed factors are considered in arriving at the predetermined distance spacing of the pins from the die edges.

Claim 9

As with the rejection based on Nishiguchi, we do not sustain the Examiner's anticipation rejection based on Kurosawa of dependent claim 9, which is dependent on claim 8, and includes the limitation that one more ejector pins is at a position "substantially at a center portion" of the die. We agree with Appellants (App. Br. 12) that the Examiner has not indicated where this feature is found in the Kurosawa reference. While our previous discussion found that the Examiner did not err in determining that the pins 17 and 27 illustrated in Figures 3A-3C, 6, and 7A-7D of Kurosawa could reasonably be interpreted as being located at "substantially at the corners" of the die, the Examiner has never explained how such pins could also be considered to be "substantially at a center portion" of the die as set forth in claim 9.

35 U.S.C. § 103(a) REJECTIONS

Nishiguchi

Claims 3-5

We do not sustain the Examiner's obviousness rejection of dependent claims 3-5 which are directed to the varied distances of the ejector pins from the edges of the die based on various factors which include the thickness of

the die, the thickness of the film, and the adhesive strength between the die and the adhesive surface. In addressing the claimed requirements, the Examiner has taken the generalized position (Ans. 8-9) that the claimed values of the various factors could be determined by routine experimentation.

As argued by Appellants (App. Br. 14), however, several of the variables cited by the Examiner, i.e., temperature and condition of delivery, do not appear in the claims and have no relation to what is actually claimed. Further, although we found in our earlier discussion with respect to claim 2 that Nishiguchi's disclosure could be reasonably interpreted as including a surface area size factor in considering the ejector pin displacement distance from the die edges, Nishiguchi's disclosure is completely silent as to the consideration of any of the factors recited in claims 3-5 such as die thickness, film thickness, and adhesive strength. Further, to whatever extent the Examiner's argument (Ans. 8-9) that the optimum values for the claimed factors can be obtained through routine experimentation has merit, such argument is unpersuasive since Nishiguchi has no disclosure of considering any of the claimed factors in the first instance.

Claim 10

We sustain the Examiner's obviousness rejection of dependent claim 10 which is directed to a particular value for the support area of each of the ejector pins. It is our view that, since the size of the die varies as previously discussed and as pointed out by the Examiner, an ordinarily skilled artisan would have found it obvious to chose through routine experimentation an ejector pin support area in Nishiguchi dependent on die size that would be

sufficient to provide enough pushing force to separate the die from the adhesive film. As further discussed by the Examiner (Ans. 6-7), Appellants have not shown any criticality for the particular claimed ejector pin support area value of “at least $1 \times 10^{-4} \text{ mm}^2$ ”. To the contrary, Appellants’ disclosure of the claimed value indicates that it is only a *preferred* value (Spec. 7:25-26).

Kurosawa

Claims 3-5

We do not sustain the Examiner’s obviousness rejection of dependent claims 3-5 for similar reasons as those discussed with regard to Nishiguchi. We find that Kurosawa’s disclosure is completely silent as to the consideration of any of the factors recited in claims 3-5 such as die thickness, film thickness, and adhesive strength in determining the ejector pin displacement distance from the die edges. As with Nishiguchi, to whatever extent the Examiner’s argument (Ans. 8-9) that the optimum values for the claimed factors can be obtained through routine experimentation has merit, such argument is unpersuasive since Kurosawa has no disclosure of considering any of the claimed factors in the first instance.

Claim 10

As with Nishiguchi, we sustain the Examiner’s obviousness rejection, based on Kurosawa, of dependent claim 10 which is directed to a particular value for the support area of each of the ejector pins. Kurosawa illustrates in Figure 12 different ejector pin support area configurations. It is our view

that, similar to our discussion with regard to Nishiguchi, an ordinarily skilled artisan would have found it obvious to chose through routine experimentation an ejector pin support area in Kurosawa that would be sufficient to provide enough pushing force to separate the die from the adhesive film. As also discussed previously, Appellants have disclosed the particular claimed value of “at least $1 \times 10^{-4} \text{ mm}^2$ ” as being a *preferred* value and has not demonstrated any criticality for the claimed value.

CONCLUSION

Based on the analysis above, we conclude that, with respect to the Nishiguchi reference, Appellants have not shown that the Examiner erred in rejecting claims 2, 8, and 21 for anticipation under 35 U.S.C. § 102(b), nor in rejecting claim 10 for obviousness under 35 U.S.C. § 103(a). Appellants have shown the Examiner erred in rejecting claims 6, 7, and 9 for anticipation and claims 3-5 for obviousness.

With respect to the Kurosawa reference, we conclude that Appellants have not shown the Examiner erred in rejecting claims 2, 6-8, and 21 for anticipation under 35 U.S.C. § 102(e), nor in rejecting claim 10 for obviousness under 35 U.S.C. § 103(a). Appellants have shown the Examiner erred in rejecting claim 9 for anticipation and claims 3-5 for obviousness.

DECISION

The Examiner’s decision rejecting claims 2, 6-9, and 21 under 35 U.S.C. § 102 is affirmed with respect to claims 2, 6-8, and 21, but is reversed with respect to claim 9. The Examiner’s decision rejecting claims

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3-5 and 10 under 35 U.S.C. § 103(a) is affirmed with respect to claim 10, but is reversed with respect to claims 3-5. Accordingly, the Examiner's decision is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2010).

AFFIRMED-IN-PART

gvw

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